

Abstract of the Disclosure

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Integrated circuits, the key components in thousands of electronic and computer products, include interconnected networks of electrical components. The components are typically wired, or interconnected, together with aluminum wires.

- 5 In recent years, researchers have begun using copper instead of aluminum to form integrated-circuit wiring, because copper offers lower electrical resistance and better reliability at smaller dimensions. However, copper typically requires use of a diffusion barrier to prevent it from contaminating other parts of an integrated circuit. Unfortunately, typical diffusion barrier materials add appreciable resistance
- 10 to the copper wiring, and thus negate some advantages of using copper. Moreover, conventional methods of forming the copper wiring are costly and time consuming. Accordingly, the inventors devised one or more exemplary methods for making integrated-circuit wiring from materials, such as copper-, silver-, and gold-based metals. One exemplary method removes two or more masks in a single removal
- 15 procedure, forms a low-resistance diffusion barrier on two or more wiring levels in a single formation procedure, and fills insulative material around and between two or more wiring levels in a single fill procedure. This and other embodiments hold the promise of simplifying fabrication of integrated-circuit wiring dramatically.

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